May 20, 1941. V. O. BEEDE 2,242,222

TRACK SHOE

Filed Oct. 11, 1939

Fig. 1.

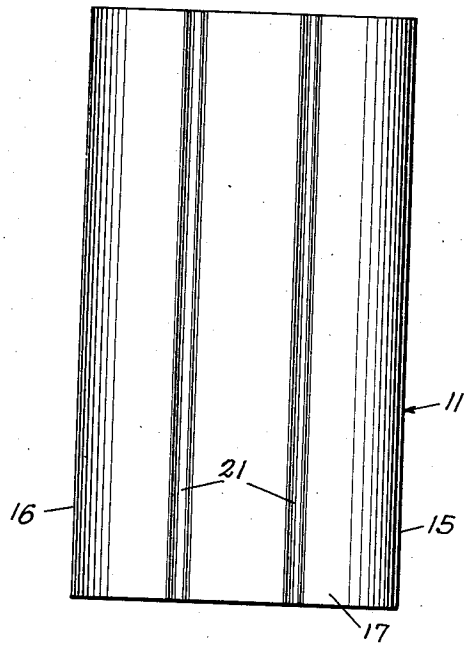


Fig. 2.

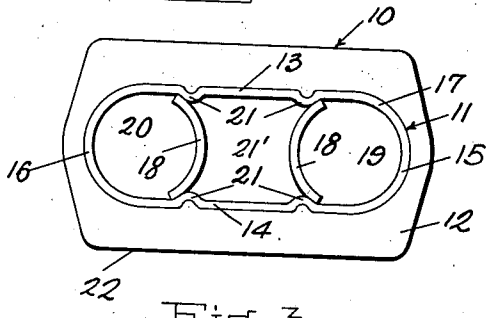


Fig. 3.

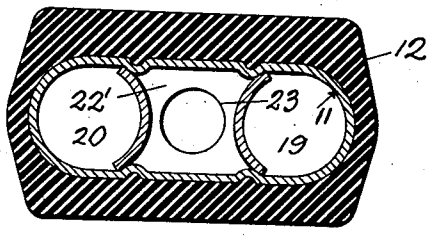


Fig. 4.

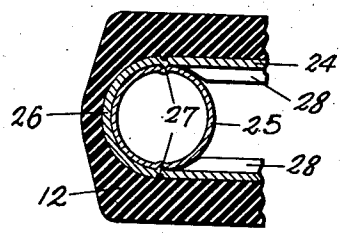


Fig. 5.

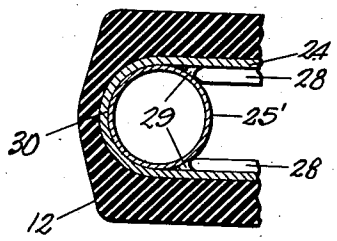
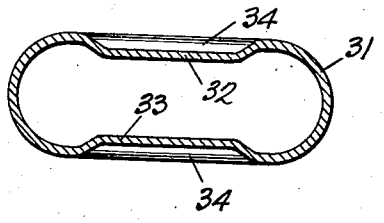


Fig. 6.



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UNITED STATES PATENT OFFICE

2,242,222

TRACK SHOE

Virgil O. Beede, Arlington, Va.

Application October 11, 1939, Serial No. 298,969

10 Claims. (Cl. 305—10)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a track shoe for tracks employed in vehicles of the track laying type.

In the prior art it has been commonplace to utilize a track shoe in the fabrication of tracks which comprises a pair of spaced parallel tubular members joined into a rigid unit by interconnecting side plates and suitably embedded in a resilient tread substance, such as rubber, as exemplified for example by U. S. Patent No. 2,113,018. While this general type of shoe is desirable in a track it is nevertheless subject to failure at the points where the side links are bored to receive the tubular members when the tread is sufficiently worn away to permit contact of the side plates with the ground due to the small sectional area of metal at these points for transmitting the track pull stress between adjacent tubular members. Moreover, the side plates preclude the full use of the depth of rubber on the traction face of the shoe as the effective depth of the tread and seriously interfere with the employment of suitable ventilating expedients for keeping the track at a desirable temperature.

Accordingly it is a principal object of this invention to set forth an economical track shoe construction wherein side plates have been eliminated.

It is another important object of this invention to provide a track shoe having a resilient traction face in which substantially the full depth of the resilient substance comprising the face may be effectively utilized as a tread or traction surface.

A still further object of this invention is the provision of a track shoe having a resilient tread surface formed with a greater depth of tread, a greater width of tread, and a smaller amount of resilient substance than used in conventional shoes designed for the same conditions in accordance with the prior art teachings.

Another object of this invention is the provision of a track shoe having a resilient tread wherein the tread is uniformly stressed to avoid disintegration thereof.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawing in which:

Fig. 1 is a plan view of a track shoe insert embodying this invention.

Fig. 2 is an end elevation of a track shoe embodying the track shoe insert shown in Fig. 1.

Fig. 3 is a cross section of a track shoe similar to the one disclosed in Figs. 1 and 2 showing a slight modification.

Figs. 4 and 5 are fragmentary sectional views showing modifications, and

Fig. 6 is a modification of the reinforcing frame or insert of this invention.

Referring now to the drawing by characters of reference and more particularly to Fig. 2 there is shown a track shoe 10 adapted to be interconnected in spaced relation with similar track shoes to form an endless track. As the means for interconnecting the shoes into an endless track form no part of the present invention and may comprise any of the expedients suitable for such purpose so well known in the art it will suffice for the purpose of this invention to simply refer to U. S. Patent 2,129,696 which in Figs. 1 and 2 discloses one type of link means that may be used for such purpose.

The track shoe 10 is a composite structure comprising the reinforcing frame or insert 11 suitably embedded within an outer resilient block 12.

As disclosed in Fig. 2 the insert 11 is comprised of a pair of oppositely disposed spaced parallel rectanglar members 13 and 14 joined to each other at adjacent ends by arcuate portions 15 and 16, respectively, struck on similar predetermined radii, to form a transversely elongated tubular element indicated in its entirety by the character 17. Preferably the tubular element 17 is an integral metallic element formed from seamless steel tubing. At either of the ends of element 17 an arcuate member 18 coextensive in width with the element 17 and struck on a radius corresponding to the radii of arcuate portions 15 and 16 is inserted therewithin with the concavities of the members confronting the concavities of portions 15 and 16, respectively, to form generally cylindrical bearings 19 and 20 for the bushings of the track shoe interconnecting links. The arcuate members 18 may be secured within element 17 in any desirable manner; but, as herein shown are retained in position against inward displacement by inwardly extending ridges 21 deformed from members 13 and 14 into abutting engagement with the convex sides of the members adjacent their longitudinal edges. As will be obvious from inspection outward displacement of members 18 will be prevented by the link pin

bushings which are inserted in the bearings 19 and 20.

The insert 11 thus formed is suitably embedded in transversely enclosed relation by the resilient tubular block 12 of any desirable resilient substance, such as rubber by molding or in other suitable manner and where the members 18 are retained in position by ridges 21 as in Fig. 1 the ridges will also serve to effect a substantial bond between the insert 11 and block 12.

By forming a composite track shoe in accordance with the above disclosure it will be noted that the tread 22 of the block may be extended to the lateral edges of the insert 11 which makes it possible to employ the overall width of the track shoe as a tread surface and thereby materially increase the width of the tread of a track shoe of given overall width inasmuch as no part of the overall width is occupied by side links for interconnecting the bushing housings or bearings 19 and 20. This construction will therefore correspondingly decrease the unit pressure on the track shoe and increase its life. Likewise the life of the shoe in use is increased as the effective depth of the tread 22 by this construction is the depth of the block 12 on the tread face, in that the elimination of side links for interconnecting the bearings 19 and 20 eliminates the protrusion of any metallic portions into the tread depth of the block 12 beyond the outer surface of portion 14, which would limit the depth of rubber in the tread of the block 12 effective for use to a depth corresponding with the outer surface of any such protrusions. Furthermore by a construction such as shown in Fig. 1, a relatively large unobstructed interior space 21' open at both ends is provided which permits unimpeded radiation from the insert 11 of the heat developed in the track for the purpose of preventing deterioration of the shoe from overheating.

In Fig. 3 a slight modification of the insert 11 as shown in Fig. 2 is disclosed. As modified in this case the insert 11 is provided at spaced intervals with reinforcing struts or plates 22' extended between the interior surfaces of portions 13 and 14 intermediate the bearings 19 and 20 to reenforce the insert against buckling upon impact of the track shoe with any uneven surface tending to throw the entire load on the shoe between bearings 19 and 20. While the reinforcements 22 may take any suitable form they are herein shown as comprising plates 22' perforated at 23 to permit unobstructed radiation of heat and escape of mud.

Fig. 4 shows a modification of the track shoe comprising a transversely elongated tubular element 24 similar to the element 17 of insert 11. In this case, however, the link pin bearing 25 is formed from a tubular element of generally circular section inserted within the element 24 in snug engagement with the arcuate portion 26 and retained in place by a continuous or series of spaced interlocking indents 27 formed in the elements 24 and 25. Although only one bearing 25 of the track shoe is shown it will of course be obvious that the complete track shoe will include a second bearing symmetrically disposed as in the case of Fig. 2. If desired longitudinally spaced transversely extending webs 28 may be interposed between link pin bearings to reinforce the element 24. The indents 27 in the bearings 25 also serve an additional function in securing a good bond between the usual rubber bushings inserted in the bearings and the bearings 25.

The modification in Fig. 5 is quite similar to the structure of Fig. 4. The bearing 25' is formed from a tubular element of circular section as in the case of the structure of Fig. 4 and likewise transversely extending reinforcing webs 28 are provided but in this form of the invention the webs and bearings 25' are secured within element 24 by the welding 29. If desired the bearing 25' may additionally be welded to element 24 as by the spot welds 30.

The modified reinforcing insert shown in Fig. 6 comprises a transversely elongated tubular reinforcing element 31 having its opposed side portions 32 and 33 inwardly deformed in parallel spaced relation as shown and provided with spaced integral transverse reinforcing webs or ribs 34 formed during the deforming of parts 32 and 33. The link pin bearings may be formed in this insert as in any of the hereinbefore described methods.

Having now particularly described the invention, what I claim and desire to secure by U. S. Letters Patent is:

1. A composite track shoe including an unitary metallic insert coextensive in width with the width of the track comprised of two opposed, spaced substantially parallel, and rectangular portions joined at their adjacent transverse ends by arcuate portions, and a resilient tubular block coextensive in longitudinal dimension with said insert secured to and transversely enclosing the same, said track shoe being open across both of its longitudinal ends; whereby thorough ventilation of the shoe is provided.

2. A composite track shoe including an unitary metallic insert coextensive in width with the width of the track comprised of two opposed, spaced substantially parallel and rectangular portions joined at their adjacent transverse ends by arcuate portions, bearings formed within said insert at its opposed transverse ends adapted to receive link pins for interconnecting a plurality of the shoes into an endless track, and a resilient tubular block coextensive in longitudinal dimension with said insert secured to and transversely enclosing the same, said track shoe being open across both of its longitudinal ends; whereby through ventilation of the shoe is provided.

3. A composite track shoe including an unitary metallic insert coextensive in width with the width of the track comprised of two opposed, spaced substantially parallel and rectangular portions joined at their adjacent transverse ends by arcuate portions, arcuate bearing forming members secured within the insert in parallelism with said arcuate portions, respectively, to provide bearings adapted to receive link pins for interconnecting a plurality of the shoes into an endless track, and a resilient tubular block coextensive in longitudinal dimension with said insert secured to and transversely enclosing the same, said track shoe being open across both of its longitudinal ends; whereby through ventilation of the shoe is provided.

4. The structure of claim 3 wherein the means for securing said arcuate bearing forming members within the insert comprises detents indented from the rectangular portions into engagement with the longitudinal edges of said arcuate bearing forming members on their convex sides.

5. The structure of claim 3 wherein reinforcements spaced longitudinally of the track shoe are extended between opposed rectangular por-

tions intermediate said longitudinal bearing forming arcuate members.

6. A composite track shoe including an unitary metallic insert coextensive in width with the width of the track comprised of two opposed spaced substantially parallel and rectangular portions joined at their adjacent transverse ends by arcuate portions, tubular elements of substantially circular cross section disposed within and secured to the insert in engagement with said arcuate portions, respectively, to provide bearings adapted to receive link pins for interconnecting a plurality of the shoes into an endless track, and a resilient tubular block coextensive in longitudinal dimension with said insert secured to and transversely enclosing the same, said track shoe being open across both of its longitudinal ends; whereby through ventilation of the shoe is provided.

7. The structure of claim 6 wherein said tubular elements of substantially circular cross section are secured in position by cooperating indents formed in the insert and tubular elements.

8. The structure of claim 6 wherein spaced longitudinally of said shoe webs are interposed between said tubular elements in engaging relation therewith.

9. In a track shoe an unitary insert coextensive in width with the width of the track comprising a transversely elongated tubular element provided with inwardly depressed parallel sides joined at adjacent opposed ends by arcuate portions and longitudinally spaced webs lying wholly within said depressions and transversely extending between said arcuate portions.

10. A track shoe comprising a transversely elongated tubular unitary insert coextensive in width with the width of the track having parallel sides joined at opposed adjacent ends by arcuate portions and a resilient tubular block coextensive in longitudinal dimension with said insert secured to and transversely enclosing the same, said track shoe being open across both of its longitudinal ends; whereby through ventilation of the shoe is provided.

VIRGIL O. BEEDE.